

## CLAIMS

- 1     1.     A method for analyzing data, the method comprising:  
2             producing and displaying a scatter plot that contains a plotted point for each of the  
3     data;  
4             determining the locations of various sets of one or more boundaries that segment  
5     the scatter plot into pluralities of regions that correspond to selection criteria interactively  
6     supplied by a user, with one or more of the sets defining at least one region of interest;  
7             recording information related to the data whose plotted points are located in a  
8     given region of interest;  
9             selecting one or more plotted points in the given region of interest; and  
10            retrieving and displaying the recorded information corresponding to the one or  
11   more selected plotted points.
- 1     2.     The method of claim 1, wherein the recorded information related to the data  
2     whose plotted points are located in the given region of interest is gene information.
- 1     3.     The method of claim 1, wherein the recorded information related to the data  
2     whose plotted points are located in the given region of interest is stored in a computer file  
3     or data base.
- 1     4.     The method of claim 3, wherein the recorded information corresponding to the  
2     one or more selected plotted points is retrieved from the computer file or data base.
- 1     5.     The method of claim 1, wherein at least one boundary in the sets of one or more  
2     boundaries is derived based on one of the following:  
3             (i)    a specified differential expression ratio calculated as the quotient of a vari-  
4     able associated with an x-axis and a variable associated with a y-axis, or  
5             (ii)   a predetermined noise level, or  
6             (iii) statistics of the data, or  
7             (iv)   a predetermined number of points are located outside the boundary.

1     6.     A microarray scanning system adapted to acquire fluorescence measurements  
2     representative of the extent to which a genetic sample reacts with both a test sample and a  
3     control sample, the microarray scanning system comprising:  
4             a fluorescence reader that generates a pair of test-sample and control-sample fluo-  
5     rescence measurements for each of a plurality of genetic samples;  
6             a processor that receives the pairs of test-sample and control-sample fluorescence  
7     measurements generated by the fluorescence reader and produces a scatter plot graphing  
8     each test-sample fluorescence measurement against its corresponding control-sample  
9     fluorescence measurement;  
10            a data input device that interactively receives selection criteria from a user and  
11     forwards the user-specified selection criteria to the processor, wherein the processor is  
12     configured to process the user-specified selection criteria to determine locations of vari-  
13     ous sets of one or more boundaries in the scatter plot; and  
14            a display unit that displays the scatter plot and superimposes the sets of one or  
15     more boundaries over the displayed scatter plot.

1     7.     A method for displaying data on a display unit, the method comprising:  
2             plotting the data as pairs of x-coordinates and y-coordinates in an orthogonal co-  
3     ordinate system to generate a scatter plot that is displayed on the display unit;  
4             determining the location of a first set of one or more boundaries in the orthogonal  
5     coordinate system based on a first set of selection criteria interactively provided by a  
6     user, with at least one boundary in the first set of one or more boundaries defining a first  
7     region of interest in the orthogonal coordinate system;  
8             superimposing the first set of one or more boundaries over the scatter plot dis-  
9     played on the display unit;  
10            changing the visual properties of pairs of x-coordinates and y-coordinates dis-  
11     played by the display unit in the first region of interest;  
12            determining the location of a second set of one or more boundaries in the or-  
13     thogonal coordinate system based on a second set of selection criteria interactively pro-  
14     vided by a user, with at least one boundary in the second set of one or more boundaries  
15     defining a second region of interest in the orthogonal coordinate system;

16 removing the first set of one or more boundaries from the scatter plot displayed on  
17 the display unit and returning the visual properties of pairs of x-coordinates and y-  
18 coordinates in the first region of interest to their original visual properties;  
19 superimposing the second set of one or more boundaries over the scatter plot dis-  
20 played by the display unit; and  
21 changing the visual properties of pairs of x-coordinates and y-coordinates dis-  
22 played by the display unit in the second region of interest.

1 8. The method of claim 7, wherein the first and second regions of interest are the  
2 same region displayed on the display unit.

1 9. The method of claim 7, wherein pairs of x-coordinates and y-coordinates located  
2 in the first and second regions of interest are displayed by the display unit using a differ-  
3 ent color than pairs of x-coordinates and y-coordinates located outside the respective first  
4 and second regions of interest.

1 10. The method of claim 7, wherein pairs of x-coordinates and y-coordinates located  
2 in the first and second regions of interest are displayed by the display unit using a differ-  
3 ent intensity than pairs of x-coordinates and y-coordinates located outside the respective  
4 first and second regions of interest.

1 11. The method of claim 7, wherein pairs of x-coordinates and y-coordinates located  
2 in the first and second regions of interest are displayed by the display unit using a differ-  
3 ent background color than pairs of x-coordinates and y-coordinates located outside the  
4 respective first and second regions of interest.

1 12. A display device adapted to display data, the display device comprising:  
2 means for plotting the data as pairs of x-coordinates and y-coordinates in an or-  
3 thogonal coordinate system to generate a scatter plot that is displayed on the display unit;  
4 means for determining the location of a first set of one or more boundaries in the  
5 orthogonal coordinate system based on a first set of selection criteria interactively pro-

6 vided by a user, with at least one boundary in the first set of one or more boundaries de-  
7 fining a first region of interest in the orthogonal coordinate system;

8 means for superimposing the first set of one or more boundaries over the scatter  
9 plot displayed on the display device;

10 means for changing the visual properties of pairs of x-coordinates and y-  
11 coordinates displayed by the display device in the first region of interest;

12 means for determining the location of a second set of one or more boundaries in  
13 the orthogonal coordinate system based on a second set of selection criteria interactively  
14 provided by a user, with at least one boundary in the second set of one or more bounda-  
15 ries defining a second region of interest in the orthogonal coordinate system;

16 means for removing the first set of one or more boundaries from the scatter plot  
17 displayed on the display device and returning the visual properties of pairs of x-  
18 coordinates and y-coordinates in the first region of interest to their original visual proper-  
19 ties;

20 means for superimposing the second set of one or more boundaries over the scat-  
21 ter plot displayed by the display device; and

22 means for changing the visual properties of pairs of x-coordinates and y-  
23 coordinates displayed by the display device in the second region of interest.

1 13. A computer-readable medium having instructions for execution on a processor,  
2 said instructions for a method for analyzing data, the method comprising:

3 producing and displaying a scatter plot that contains a plotted point for each of the  
4 data;

5 determining the locations of various sets of one or more boundaries that segment  
6 the scatter plot into pluralities of regions that correspond to user specified selection crite-  
7 ria, with one or more sets including at least one region of interest;

8 recording information related to the data whose plotted points are located in a  
9 given region of interest;

10 selecting one or more plotted points in the given region of interest; and  
11 retrieving and displaying the recorded information corresponding to the one or more se-  
12 lected plotted points.

- 1 14. The computer-readable medium of claim 13 wherein said instructions further in-
- 2 clude, in the step of recording information, storing the information in a data file or data
- 3 base.